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NPS/002/011 – Technical Specification for Cable Cleats and Saddles

1. Purpose

The purpose of this document is to detail the requirements of Northern Powergrid (the Company) in relation to cable cleats/saddles used to support and fix various sizes and types of cables utilised on the companies' distribution system.

This document supersedes the following documents, all copies of which should be destroyed.

Document Reference	Version	Date	Title
NPS/002/011	5.0	Sept 2016	Technical Specification for Cable Cleats and Saddles

2. Scope

This specification details the requirements for single core and trefoil cable cleats for the voltage range 230/400volts to 132kV.

Technical documents referenced within this specification refer to the latest versions of the relevant International Standards, British Standard Specifications and all relevant Energy Networks Association Technical Specifications (ENATS) current at the time of supply.

The following appendices form part of this technical specification:

- Appendix 1 – Typical Cable Diameters,
- Appendix 2 – Schedule of Requirements,
- Appendix 3 - Logistical Requirements,
- Appendix 4 - Self Certification Conformance Declaration,
- Appendix 5 - Addendum to Supplier Requirements, and,
- Appendix 6 - Technical Information Check List.

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3. Technical Requirements

3.1. General

In accordance with BS EN 61914 – ‘Cable cleats for electrical installations’, cleats shall where required be:

- Capable of accommodating a pre-defined size or range of cable or cable bundle diameter without cracking or breaking, or stripping screw threads.
- Hold securely cables from 230v up to and including 132kV (Note: cable at 66kV and 132kV will have metallic sheath).
- Hold the cable without slippage when holding cables in a vertical situation such as on overhead terminations or on vertical risers.
- Operating temperatures shall be in the range as defined by BS EN 61914, section 6.2, Table 1 = + 40°C for maximum temperature and Table 2 = -15°C for minimum temperature.
- Resistant to impact at the minimum declared temperature (BS EN 61914, section 9.2).
- Capable of withstanding the lateral load at the maximum declared temperature (BS EN 61914, section 9.3).
- Capable of withstanding the axial load at the maximum declared temperature (BS EN 61914, section 9.4).
- Resistant to electromechanical forces (BS EN 61914, section 9.5).
- Non-metallic and composite cable cleats shall have adequate resistance to flame propagation. Metallic or composite cleats shall have adequate resistance to corrosion.
- The surfaces of cleats and intermediate restraints shall be free from sharp edges, burrs, flash, etc. that are likely to damage cables or inflict injury to the installer or user.
- After installation the cleats can be expected to be subjected to the full range of climatic conditions encountered in the UK, and may be exposed to sunlight for a significant period. Cleats may be installed onto wood poles and therefore in contact with the pole preservation medium such as creosote.
- The Sizes in appendix 1 are indicative and manufactures data sheets must be checked for sizing and weight to ensure the correct cleat is used.

3.2. Trefoil Cable Cleat

Trefoil cable cleats shall be so designed to fix, retain and support cables to wood poles, steel structures etc. and shall be capable of supporting the cables during a fault/short circuit situation.

The cleats shall be range taking, hot dipped galvanised in accordance with BS 7371-6 – ‘Coatings on metal fasteners. Part 6: Specification for hot dipped galvanized coatings’ and shall be either single or two bolt fixing, with the plastic fillers/pads being manufactured from a flame retardant material.

The range of cables to be covered is detailed in Appendix 1.

3.3. Single Fixing Cleat

Single fixing cleat, shall be manufactured from a flame retardant polypropylene (or equivalent material), and so designed to secure and support the cables and resist the mechanical and electrical loads of the Distribution system.

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The range of cables to be covered is detailed in Appendix 1.

3.4. Single Way Snap on Saddle

Single way two bolt fixing snap on saddle clips, for securing power cables and uPVC ducts. The shoulders of the saddle shall be so designed to hold the cable or ducting away from the mounting surface.

The range of cables to be covered is detailed in Appendix 1.

3.5. Pole Cleat

Heavy duty pole cleats designed to secure power cables onto wood poles. The curvature of the cleats mounting surface shall be appropriate for 200mm diameter pole. Cleats installed onto wood poles will be in contact with the pole preservation medium such as creosote.

3.6. Single Fixing Cable Cleat and Spacer

Range-taking two way stacking cleat suitable for securing power cables onto wood poles and flat surfaces. A requirement also exists for a suitable spacer, which would allow multiple cables to be stacked. The cleat and spacer shall be suitable for an M10 coach screw type fixing.

3.7. One and Two hole Cable Clamp

The cable clamps shall be manufactured from materials with adequate resistance to flame propagation as detailed in BS 61914 – ‘Cable cleats for electrical installations’, clause 10.1; and so designed to secure and support the cables onto flat surfaces and resist the mechanical and electrical loads of the Distribution system.

The range of cables to be covered is detailed in Appendix 1.

3.8. Washers

Manufactured from black polypropylene or a similar material, two types of washers are required, one to act as a “cushion” and one to ‘stand-off’ signs and notices, which are to be permanently attached to wood poles, substation doors etc.

Requirements are detailed in Appendix 1.

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4. References

The products described within this document shall comply with the relevant International Standards, British Standard Specifications and all relevant Energy Networks Association Technical Specifications (ENATS) current at the time of tendering, except where varied by this standard. In respect the following documents are particularly relevant.

The supplier shall provide with the tender full technical details of the equipment offered and shall indicate any divergence from these standards or specifications.

4.1. External Documentation

Reference	Version / Date	Title
BS 7371-6+A1	2011	Coatings on metal fasteners. Part 6: Specification for hot dipped galvanized coatings
BS EN 61914	2021	Cable cleats for electrical installations

4.2. Internal Documentation

Reference	Title
n/a	n/a

4.3. Amendments from Previous Version

Reference	Update
4.1 External Documentation	Latest revision documented
6. Authority for Issue	Amended to reflect current signature list
Appendix 2	New item added to schedule of items
Appendix 4	Reference to British Standard year of issue removed
Appendix 5	Removed as it replicates Appendix 3
Appendix 6	Renumbered Appendix 5

5. Definitions

Term	Definition
The Company	Northern Powergrid

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6. Authority for Issue

6.1. CDS Assurance

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

		Date
Liz Beat	Governance Administrator	03/03/2022

6.2. Author

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

Review Period - This document should be reviewed within the following time period.

Standard CDS review of 3 years	Non-Standard Review Period & Reason	
No	Period: 5 Years	Reason: Update will be dictated by contract renewal date or any significant changes in the specification or documents referenced.
Should this document be displayed on the Northern Powergrid external website?		Yes
		Date
Steven Salkeld	Policy and Standards Engineer	03/03/2022

6.3. Technical Assurance

I sign to confirm that I am satisfied with all aspects of the content and preparation of this document and submit it for approval and authorisation.

		Date
Joseph Helm	Policy and Standards Manager	23/02/2022

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Paul Black	System Engineering Manager	24/03/2022

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Appendix 1 – Typical Cable Diameters

Single and Trefoil Cable Cleat (Ref Section 3.2)		
Range of Cable Type	Approximate Cable Diameter for Triplex Formation (mm)	Approximate Diameter of Individual Core (mm)
11kV - 95mm ² Solid Aluminium Core	60.5	28.1
11kV – 185mm ² Solid Aluminium Core	68.1	31.6
11kV – 300mm ² Aluminium Core	80.4	37.3
11kV – 300mm ² Stranded Copper Core	80.6	37.4
11kV – 400mm ² Stranded Copper Core	-	40.8
11kV – 300mm ² Stranded Copper Core	-	48.5
20kV - 95mm ² Solid Aluminium Core	68.4	31.7
20kV - 185mm ² Solid Aluminium Core	78.15	36.27
20kV - 400mm ² Stranded Copper Core	101	47.0
33kV 300mm ² Stranded Copper Core		49.5
33kV - 400mm ² Stranded Copper Core		52.5
33kV - 500mm ² Stranded Copper Core		56
33kV - 630mm ² Stranded Copper Core		60
66kV - 400mm ² Stranded Copper Core		65
66kV - 500mm ² Stranded Copper Core		70
66kV - 630mm ² Stranded Copper Core		73
132kV - 400mm ² Stranded Copper Core		86
132kV - 500mm ² Stranded Copper Core		88
132kV - 630mm ² Stranded Copper Core		92

- Sizes are indicative and manufactures data sheets must be checked for sizing and weight

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Single Fixing Cleat (Ref Section 3.3)	
Range of Cable Type	Approximate Diameter of Cable (mm)
16mm ² Single phase CNE Stranded Copper	12.3
16mm ² Single phase SNE Stranded Copper	14.9
25mm ² CNE Single Phase Solid Aluminium Core	13.0
25mm ² SNE Single Phase Solid Aluminium Core	14.8
35mm ² CNE Single Phase Solid Aluminium Core	14.4
35mm ² SNE Single Phase Solid Aluminium Core	18.1
25mm ² CNE 3-Core Solid Aluminium	22.6
35mm ² CNE 3-Core Solid Aluminium	24.8
35mm ² CNE LSF Single Phase Solid Aluminium Core	13.5

Single Way Snap on Saddle (Ref Section 3.4) & Pole Cleat (Ref Section 3.5)	
Range of Cable Type	Approximate Diameter of Cable (mm)
95mm ² Waveform: 3-Core Solid Aluminium	34.2
95mm ² Waveform: 4-Core Solid Aluminium	38.3
185mm ² Waveform: 3-Core Solid Aluminium	46.6
185mm ² Waveform: 4-Core Solid Aluminium	53.2
300mm ² Waveform: 3-Core Solid Aluminium	56.0
300mm ² Waveform: 4-Core Solid Aluminium	63.0

Single Fixing Cable Cleat and Spacer (Ref Section 3.6)	
Range of Cable Type	Approximate Diameter of Cable (mm)
35mm ² Double Insulated Single Core Copper Conductor	12
95mm ² Double Insulated Single Core Copper Conductor	19

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120mm ² Double Insulated Single Core Copper Conductor	20.5
150mm ² Double Insulated Single Core Copper Conductor	23.5

One and Two Hole Cable Clamp (Ref Section 3.7)	
Range of Cable Type	Approximate Diameter of Cable (mm)
One Hole Cable Clamp For Cable Range	19mm – 23mm with 10mm fixing hole
Two Hole Cable Clamp For Cable Range	57mm – 64mm with 10mm fixing holes
	70mm – 76mm with 10mm fixing holes

Washers (Ref Section 3.8)
Requirements
Washer: 14mm x 2mm thick x 5mm fixing hole
Washer: 14mm x 6mm thick x 5mm fixing hole

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Appendix 2 – Schedule of Items

Ref	Description	Commodity Code
1	Cable Support, Claw Cleat, 38-44mm	143469
2	Cable Support, Claw Cleat, 44-51mm	143473
3	Aluminium trefoil cable cleat for 34-35mm single core cables.	160286
4	Aluminium trefoil cable cleat with 2 bolt fixing for 36 to 38 mm single core cables.	160290
5	Aluminium trefoil cable cleat with 2 bolt fixing for 27 to 28 mm Triplex cables.	160292
6	Aluminium trefoil cable cleat with 2 bolt fixing for 30 to 32 mm single core cables.	160294
7	Cable Cleat, 2 Bolt, 51-57mm, Aluminium Alloy	240118
8	Cable-Cleat, Metal, 2 Bolt, 57-64mm	240122
9	Cleat: Single Bolt Fixing Trefoil Cleat for 35 - 40mm Dia. Single Core Cables.	160229
10	Cleat: Single Bolt Fixing Trefoil Cable Cleat for 30 - 35mm Dia. Single Core Cables.	160252
11	Clamp: 2-Holed Cable Clamp Low Smoke & Fume Nylon: for 70 - 76mm Dia. Cables	240137
12	Cleat: 1-Way Single Fixing Flame Retardant Cable Cleat: for 24.8mm Dia. Cables	244250
13	Cleat - 2 Way, 95mm, Copper Insulation and Sheath, Drawing No. 1.09.101.0130, Sheet 1A, Ref. 2WP15B	244636
14	Cleat, 35/95mm, Tx. LV, Leads 30-272 (Out), Drawing No. 1.09.101.0130, Item 1	244744
15	Cleat Spacer, 30-272/S, (For Cat No 244744), Drawing No. 1.09.101.0130, Item 2	244759
16	Cleat: Single Way Snap-On Saddle Cleat: for 27.5mm Dia. Cables	244763
17	Cleat: Single Way Snap-on Saddle Cleat: for 44.4mm Dia. Cables	244797
18	Cleat: Single Way Snap-on Saddle Cleat: for 48.7mm Dia. Cables	244814
19	Cleat: 1-Way Single Fixing Flame Retardant Cable Cleat: for 11.7mm Dia. Cables	244852
20	Cable Saddle, 25SNE/35 SNE - HY, 95 I & S, Ref. 10-72FR	244871
21	Cleat: 1-Way Single Fixing Flame Retardant Cable Cleat: for 14.2mm Dia. Cables.	245003
22	Cleat: 1-Way Single Fixing; Flame Retardant Cable Cleat: for 10.6mm Dia. Cables	248815
23	Cleat: 1-Way Single Fixing Flame Retardant Cable Cleat; for 13.5mm Dia. Cables	260376
24	Clamp: Two Hole Cable Clamp for 57 - 64mm Dia. cables	291062
25	One Hole Cable Clamp (for cable Dia. 19-23 single cable)	291104
26	Cleat Spacer: 2-Way Single Fixing Cable Cleat Spacer for 6.35 - 12mm Dia. cables	291294
27	Cleat: 1-Way Single Fixing Cable Cleat: for 21.1mm Dia. Cables	291336
28	Cleat: Single Way Heavy Duty Radiused Pole Cleat: 72.5mm Cables	291377
29	Cleat Cable Telcleat 26.2mm-34.2mm	291534
30	Cleat Cable Telcleat 10.5mm-14.5mm	291559
31	Cleat Cable Telcleat 12.2mm-16.7mm	291575
32	Single Bolt Fixing 1 Core 66kV Aluminium Cable Cleat 66.1mm (Atlas Range Taker Cleats for Trefoil/Single Cable)	291583
33	Trefoil Cable Cleat for 33kV Copper Cable Dia 45.6mm (Atlas Range Taker Cleats for Trefoil/Single Cable)	291609
34	Cleat: Single Fixing Trefoil Cable Cleat for 50 - 55mm Dia. Single Core Cables	291617
35	Cleat: Single Way Heavy Duty Radiused Pole Cleat: 61.6mm Cable	291625
36	Cleat: Single Bolt Fixing Trefoil Cable Cleat: For 60 - 66mm Dia. Single Core Cables	291633
37	Cleat: 2-Way Heavy Duty Radiused Pole Cleat: For 14.2mm Dia. Services Cables	291641
38	Cleat: Single Bolt Fixing Trefoil Cable Cleat: for 45 - 50mm Single Core Cables	291674
39	Cleat: Single Way Heavy Duty Radiused Pole Cleat: 44.6mm Cable	291765
40	Cleat: Self Locking Earth Strip Cleat: for Earth Strip 40mm x 6mm.	291773
41	Cleat: 1-Way Single Fixing; Flame Retardant Cable Cleat: 9.0mm Dia. Cables	291781
42	Cleat: Single Way Heavy Duty Radiused Pole Cleat: 31.2mm Cables	291799

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Ref	Description	Commodity Code
43	Cleat: Single Way Heavy Duty Radiused Pole Cleat: for 35.9mm Cables	291807
44	Cleat: Single Way Heavy Duty Pole Cleat: 53.5mm cables	291815
45	Cleat: 2-Way Single Fixing Cable Cleat: for 6.35 - 12mm Dia. Cables	291856
46	Cleat: 3-Way Heavy Duty Radiused Pole Cleat: For 21.7mm Dia. Service Cables	291880
47	Clamp: Single Fixing Heavy Duty Cable Clamp for 57- 64mm Dia. Single Core Cables	291898
48	Cleat: Single Way Snap-on Saddle Cleat: for 34mm Dia. Cables	291948
49	Cleat: Single Way Snap-on Saddle Cleat: for 60.5mm Dia. Cables	291955
50	Cleat: Single Way Snap-on Saddle Cleat: for 42.6mm Dia. Cables	291989
51	Cleat: Single Way Snap on Saddle Cleat: for 25.4mm Dia. Cables	291997
52	Washer: Black Nylon: 14mm X 2mm (Thick) 5mm Dia. Hole	374577
53	Washer: Black Nylon: 14mm X 6mm (Thick) 5mm Dia. Hole.	374581
54	Cable Cleat, Aluminium Alloy 2 x M10 Bolt fixing For Cable Range 57mm - 64mm	240122
55	Earth Tape Cleat. Plastic with single hole fixing suitable for 25mm x 4mm tape	354341

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Appendix 3 – Logistical Requirements

To enable the Company to store the product(s) in accordance with the manufacturer's recommendations the Tenderer shall provide details of the recommended storage environment with respect to each tendered product.

Details shall be provided where relevant, in respect of the minimum and maximum exposure levels, frequency of exposure and duration of exposure of the packaged item with respect to;

- Ambient temperature
- Atmospheric corrosion
- Humidity
- Impact
- Water
- Vibration
- Dust
- Solar radiation

The Tenderer shall ensure that each item is suitably packaged and protected to enable storage in an outdoor environment whilst maintaining the product and packaging as "fit for service" prior to installation.

All packaging shall be sufficiently durable giving regard to the function, reasonable use and contents of the packaging. Where product packages tendered are made up of sub packages all the sub packages shall unless varied by this specification, be supplied securely packaged together. Where items are provided in bagged/boxed form the material from which the bags are manufactured shall be capable of sustaining the package weight and resisting puncture by the materials within.

Tenderer shall submit at the time of tendering the details of the proposed packaging (i.e. materials composition and structure) to be used for each product. Where the Tenderer is unable to provide packaging suitable for outdoor storage then this should be stated at the time of tender.

In order to maximise storage space all palletised goods shall be supplied in standard returnable box pallets with the following specification. Where applicable, suppliers shall also indicate the maximum number of units of each product that are storable per box pallet.

- Size - 1200mm (w) x 1000mm (d) x 750mm (h)
- Weight (empty) – Up to 33kg
- Load Capacity – Up to 450kg
- Maximum Stacking Capacity – 10 High

Clearly legible, easily identifiable, durable and unambiguous labelling shall be applied to each individual and where relevant, multiple package of like products. Where products packages tendered are made up of sub packages each sub packages shall be marked. As a minimum requirement the following shall be included;

- Manufacturer's trademark or name
- Supplier's trademark or name
- Description of item
- Date of packaging and/or batch number
- Northern Powergrid product code
- Weight
- Shelf life

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Appendix 4 – Self Certification Conformance Declaration

Cable cleats and saddles are required to be supplied against this specification shall comply with the latest issues of the relevant ENATS, British and International Standards specified. The following tables are intended to amplify and/or clarify the requirements of elements of these Standards but do not preclude meeting all requirements of the standards.

The manufacturer shall declare conformance or otherwise, clause by clause, using the following levels of conformance declaration codes, where appropriate indicating if tests are type or routine tests.

Conformance declaration codes

N/A = Clause is not applicable/ appropriate to the product.

Cs1 = The product conforms fully with the requirements of this clause.

Cs2 = The product conforms partially with the requirements of this clause.

Cs3 = The product does not conform to the requirements of this clause.

Cs4 = The product does not currently conform to the requirements of this clause, but the manufacturer proposes to modify and test the product in order to conform.

Manufacturer / Supplier:

Manufacturer / Supplier Product Reference:

Northern Powergrid Product Reference (Commodity Code):

Details of the Product Type: (e.g. Voltage, Conductor Type and Size)

Name:

Signature:

Date:

Instructions for completion

- When Cs1 code is entered the supplier shall provide evidence to confirm conformance.
- When any other code is entered the reason and supporting evidence for non - conformance shall be entered.
- Prefix each remark with the relevant 'BS EN' 'IEC' or 'ENATS' as appropriate.
- Provide technical data sheets and associated drawings for each product.

NOTE: One sheet shall be completed for each type of cable offered.

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NPS/002/011 – Trefoil Cable Cleat (Ref section 3.2)

	Clause / Requirements	Conformance Code	Evidence Reference	Remarks / Comments
Impact resistance	BS EN 61914: 9.2			
Lateral loading	BS EN 61914: 9.3			
Axial loading	BS EN 61914: 9.4			
Electromechanical forces	BS EN 61914: 9.5			
Flame propagation	BS EN 61914: 10.1			
Ultraviolet resistance	BS EN 61914: 11.1			
Corrosion resistance	BS 7371-6: 5.2			

NPS/002/011 – Single Fixing Cleat (Ref section 3.3)

	Clause / Requirements	Conformance Code	Evidence Reference	Remarks / Comments
Impact resistance	BS EN 61914: 9.2			
Lateral loading	BS EN 61914: 9.3			
Axial loading	BS EN 61914: 9.4			
Electromechanical forces	BS EN 61914: 9.5			
Flame propagation	BS EN 61914: 10.1			
Ultraviolet resistance	BS EN 61914: 11.1			
Corrosion resistance	BS 7371-6: 5.2			

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NPS/002/011 – Single Way Snap on Saddle (Ref section 3.4)				
	Clause / Requirements	Conformance Code	Evidence Reference	Remarks / Comments
Impact resistance	BS EN 61914: 9.2			
Lateral loading	BS EN 61914: 9.3			
Axial loading	BS EN 61914: 9.4			
Electromechanical forces	BS EN 61914: 9.5			
Flame propagation	BS EN 61914: 10.1			
Ultraviolet resistance	BS EN 61914: 11.1			
Corrosion resistance	BS 7371-6: 5.2			

NPS/002/011 – Pole Cleat (Ref section 3.5)				
	Clause / Requirements	Conformance Code	Evidence Reference	Remarks / Comments
Impact resistance	BS EN 61914: 9.2			
Lateral loading	BS EN 61914: 9.3			
Axial loading	BS EN 61914: 9.4			
Electromechanical forces	BS EN 61914: 9.5			
Flame propagation	BS EN 61914: 10.1			
Ultraviolet resistance	BS EN 61914: 11.1			
Corrosion resistance	BS 7371-6: 5.2			

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NPS/002/011 – Single Fixing Cable Cleat and Spacer (Ref section 3.6)

	Clause / Requirements	Conformance Code	Evidence Reference	Remarks / Comments
Impact resistance	BS EN 61914: 9.2			
Lateral loading	BS EN 61914: 9.3			
Axial loading	BS EN 61914: 9.4			
Electromechanical forces	BS EN 61914: 9.5			
Flame propagation	BS EN 61914: 10.1			
Ultraviolet resistance	BS EN 61914: 11.1			
Corrosion resistance	BS 7371-6: 5.2			

NPS/002/011 – One and Two Hole Cable Clamp (Ref section 3.7)

	Clause / Requirements	Conformance Code	Evidence Reference	Remarks / Comments
Impact resistance	BS EN 61914: 9.2			
Lateral loading	BS EN 61914: 9.3			
Axial loading	BS EN 61914: 9.4			
Electromechanical forces	BS EN 61914: 9.5			
Flame propagation	BS EN 61914: 10.1			
Ultraviolet resistance	BS EN 61914: 11.1			
Corrosion resistance	BS 7371-6: 5.2			

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NPS/002/011 – Washers (Ref section 3.8)				
	Clause / Requirements	Conformance Code	Evidence Reference	Remarks / Comments
Impact resistance	BS EN 61914: 9.2			
Lateral loading	BS EN 61914: 9.3			
Axial loading	BS EN 61914: 9.4			
Electromechanical forces	BS EN 61914: 9.5			
Flame propagation	BS EN 61914: 10.1			
Ultraviolet resistance	BS EN 61914: 11.1			
Corrosion resistance	BS 7371-6: 5.2			

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Appendix 5 – Technical Information Check List

The following information shall be provided by the supplier for technical review by Northern Powergrid. Additional information shall be provided if requested.

Requirement	Provided (Y/N)
Full product descriptions and part number/reference	
Appendix 3 – completed self-certification conformance declaration	
Complete set of drawings for each variant	
Type test evidence	
Routine test plan or quality plan (example)	
Packaging/delivery information	